

# Springtails and Silverfishes (Apterygota)

## Chapter 13.5

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### Abstract

The alien fauna of Apterygota is still limited in Europe. Springtails (Collembola) alien to Europe include only three species to which add a cryptogenic one. Two nowadays cosmopolitan species of silverfishes may originate from Central America. The reasons of this limited colonisation of Europe are briefly discussed.

### Keywords

Apterygota, Collembola, springtails, Zygentoma, silverfishes

### 13.5.1. Diplura alien to Europe

No introductions of alien species into Europe are known.

### 13.5.2. Collembola (Springtails) alien to Europe

Worldwide ca. 6500 collembolan species are listed, belonging to 18 families (Hopkin 1997). For Europe, there are estimated to be ca. 1500 species, belonging to 16 families (taxonomic work is still progressing).

Collembola are the most abundant terrestrial arthropods, colonising all soil habitats that provide enough humidity and food, such as organic matter or microorganisms. Example habitats include root rosettes of high alpine plants, plant debris on the shore, natural soils, as well as microhabitats such as flower pots. Most species are soil or

litter dwellers, whilst only few species live on the surface or in the vegetation (mainly Entomobryidae and Symphyleona). In mature soil, abundances may attain values of 50–100'000 individuals/m<sup>2</sup>. Local gradations in abundance are a well known phenomenon in many Collembola.

As detritivores, Collembola are not generally considered as pest species. Exceptions are two species of Symphyleona living above ground in the vegetation layer: the European *Sminthurus viridis* which became a severe pest in Australia on alfalfa, clover etc, and the ubiquitous *Bourletiella hortensis* is known to feed on vegetable seedlings when natural food (weed seedlings) is absent. The ubiquitous onychiurid *Protaphorura armata* also switches food source in the absence of weeds, but only as a secondary pest when feeding on wounds infected by microorganisms. In Europe, no Collembola are declared as agronomic pests (e.g. in CABI Crop Protection Compendium) (CABI 2009).

A 100 or more Collembola species may occur in the same soil habitat, and through occupying all available niches are believed to preclude establishment of alien species. To date, alien Collembola have only been observed to become invasive and replace indigenous species in isolated microhabitats and in extreme climates such as two species on sub-Antarctic islands (Convey et al. 1999, Greenslade 2002).

Identifying alien Collembola is difficult due to the limited number of specialists investigating soil fauna. No intentional introductions to Europe have occurred. Unintentional transport within soil of ornamental plants, with vegetables, dirty equipment and vehicles easily moves Collembola over large distances. Short life cycles and parthenogenetic development of a number of species may also increase the chances to colonise new sites. Therefore the distribution ranges of alien species within Europe may increase steadily.

Only three records of alien Collembola introduced to Europe have been published. These concern two species in the family Isotomidae, *Proisotoma filifera*, originating from Central America but found in Dutch greenhouses (Ellis 1970), and *Desoria trispinata*, that originates from North America but has appeared in anthropogenic habitats, mainly towns (Christian 1987, Christian and Kindl-Stomatopolos 1999, Kindl- Stomatopoulos). A third species in the family Onychiuridae, *Onychiurus folsomi*, originating from Australia, is restricted to earthworm cultures in Spain (Arbea and Jordana 1988). In addition, we considered a cryptogenic species, *Sminthurinus trinotatus* (Katiannidae), which presents a very disjunct known distribution (southern Europe, eastern Asia).

### **13.5.3. Zygentoma (Silverfishes) alien to Europe**

Zygentoma or silverfishes comprise five families (in Europe Lepismatidae only) with 12 genera (three in Europe) and ca. 370 species (ten in Europe). The two (today) cosmopolitan species *Ctenolepisma longicaudata* and *Thermobia domestica* (both Lepismatidae), may originate from central parts of America. Once moved from western Mediterranean regions to central and northern Europe, they mainly colonise anthropogenic habitats, where they may become pests by destroying paper or stored products.

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**Table 13.5.1.** List and characteristics of the Collembola and Zygentoma species alien to Europe. Status: **A** Alien to Europe **C** cryptogenic species. Country codes abbreviations refer to ISO 3166 (see appendix I). Habitat abbreviations refer to EUNIS (see appendix II). Last update 11/01/2010;

Order-Family Species	Status	Regime	Native range in Europe	1st record in Europe	Invaded countries	Habitat	References
<b>Collembola- Onychiuridae</b>							
<i>Onychiurus folsoni</i> (Schäffer, 1900)	A	detritivorous	Australia	1988 ?, ES	ES, GB J100	I (Vermiculture), Arbea and Jordana (1988), Hopkin (2009)	
<b>Collembola- Isotomidae</b>							
<i>Proisotoma filifera</i> (Denis, 1931)	A	detritivorous	Central America	1968, NL	NL	J100	Ellis (1970)
<i>Desoria trispinata</i> (MacGillivray, 1896)	A	detritivorous	North America	ca 1900, AT	AT, DE, IT, NO, PT, RU	J	Christian (1987), Christian and Kindl- Stamatopoulos (1999), Kindl-Stamatopoulos (2001)
<b>Collembola- Katiannidae</b>							
<i>Sminthurinus trinotatus</i> (Axelson, 1905)	C	detritivorous	South Europe, East Asia?	1925, GB	AT, DE, FR, GB, IT	I2, J100	Essl and Rabitsch (2002), Hopkin (2009)
<b>Zygentoma- Lepismatidae</b>							
<i>Ctenolepisma longicaudata</i> (Escherich, 1905)	C	detritivorous	Central America?	Unknown	CY, FR, IT, MT, PT	J1 (stored products)	Essl and Rabitsch (2002)
<i>Thermobia domestica</i> (Packard, 1873)	C	detritivorous	Central America?	Unknown	CY, DE, DK, FR, GB, IT, PT	J1 (stored products)	Essl and Rabitsch (2002)